

[CLEAN COPY OF SPECIFICATION]

Process for Manufacture of a Door Panel Having an Inner Carrier Sheet

5

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present Application claims the benefit of priority to the following
10 international Applications: PCT Patent Application No. PCT/EP03/02671
titled "Trim article, in particular for a motor vehicle, and method producing it"
filed on March 14, 2003 which published under PCT Article 21(2) on
September 25, 2003 as WO 03/078128 A1 in the German language and
German Patent Application No. DE 102 11 683.0 filed on March 15, 2002
15 (which are hereby incorporated herein by reference in their entirety).

BACKGROUND

[0002] The invention relates to a method for producing a trim article, in
20 which the interspace between a sheet-like decorative material and a carrier is
foam-filled, and to a trim article, in particular for the interior of a motor
vehicle, with a carrier, with a sheet-like decorative layer and with a foam layer
arranged between them.

[0003] The laid-open publication DE 198 14 956 A1 discloses a generic
25 method and trim article. The trim article consists of an air-permeable, if
appropriate also foam-permeably porous carrier which is covered with a
decorative film. The decorative film is drawn around (bent around) the edge
of the carrier, the interspace between the decorative film and the carrier
30 being foam filled with a polyurethane foam. During the production of this
structural article, first, the decorative film is cut to an oversize and is
preformed, including the bent-round portion by deep-drawing and cut to the

final dimension. The air-permeable carrier is subsequently inserted into the bent-round portion of the decorative film and introduced, together with the latter into the open foaming die. By the foaming die being moved into a closed position, the bent-round portion assumes its final position and, after the introduction of the foam, is adhesively bonded to the carrier by the latter. In specific regions of the trim article, in particular at locations where fastening later takes place, the film may be pressed in an knob-like manner onto the carrier and adhesively bonded there directly.

[0004] This procedure entails the disadvantage that the costly decorative film covers the carrier completely and, furthermore, also forms the bent-round portion, so that a considerable amount of material has to be used even in regions which are not visible in the installed state.

[0005] The object on which the invention is based is to lower the costs for producing a trim article and to increase process reliability during the manufacturing operation.

SUMMARY

[0006] According to the present invention, the object is achieved with regard to the method, in that, during foaming, the decorative material is pressed sealingly onto the interior-side surface of the carrier so as to run around the region to be foam-filled. The decorative material therefore has to cover only the regions (normally visible in the installed state) of the trim article which are provided with a foam layer, so that the costs for producing said trim article are reduced considerably due to the decrease in the amount of material used.

[0007] According to an embodiment of the invention, the essentially gas- and foam-impermeable decorative material may be produced, before foaming, by the solidification of a polymer sprayed into the foaming mold. In this case, foaming preferably takes place before the complete solidification of the polymer, so that the wall thickness of the decorative material and consequently the amount of material used are reduced by drawing.
5 Alternatively, the decorative material may also be introduced separately into the foaming mold.

10 **[0008]** According to a particular embodiment of the invention, the discharge of the air to be displaced during foaming takes place through the foam-tight, but, at least in regions, not gas-tight structure of the carrier. The latter can be gas-sealed in regions by the local compression of an intrinsically gas-permeable unprocessed part before introduction into the foaming die, so that
15 a control of the air discharge and, along with this, also a controlled influence on foam propagation become possible.

[0009] Preferably, the pressing zone serving for sealing off makes a permanent materially integral connection between the decorative material
20 and the carrier, which pressing zone, furthermore, may also advantageously form a tearing edge along which the decorative material located outside the foamed region is removed.

[0010] The object on which the invention is based is achieved, furthermore,
25 by means of a generic trim article which has a gas-tight pressing zone which runs around the foam layer and in which the decorative layer is connected directly to the interior-side surface of the carrier.

[0011] The preferably essentially gas-permeable decorative layer may
30 consist, for example, of a polymeric spray-on skin, consisting particularly of polyurethane, which can be produced, immediately before the foaming

operation, by the spraying of the polymer into one half of the foaming mold. Alternatively, a decorative layer may also consist of a sheet-like semifinished product, consisting particularly of a plastic film.

- 5 **[0012]** For de-aerating the space to be foam-filled, the carrier is advantageously designed, at least in regions to be gas-permeable but foam-impermeable. According to a particular design of the invention, it may in this case have gas-permeable zones which are gas-impermeable as a result of the compression of the carrier material. Particularly suitable as carrier
- 10 material is a fiber/resin pressed article, in particular consisting of resin-bound flax fibers and/or sisal fibers which also affords advantages in ecological terms on account of its content of regrowing raw materials.

15 **BRIEF DESCRIPTION OF THE FIGURES**

[0013] The figures illustrate an embodiment of the invention by way of example and diagrammatically.

- 20 **[0014]** FIG. 1 shows a section through a trim article according to the invention with a mold half, merely indicated, for the foaming die

[0015] FIG. 2 shows an elevational view of the trim article according to fig.
1

25

[0016] FIG. 3 shows the forming of a semifinished product into the carrier of the trim element.

DESCRIPTION OF THE PREFERRED AND EXEMPLARY EMBODIMENTS

5 [0017] As is evident from figures 1 and 2, the trim article 1 consists of a carrier 3 which is connectable to the metal structure 2 of the vehicle body and which, on its side confronting the vehicle interior 4, is covered in regions with a sheet-like decorative material 5. For the purpose of soft-handling, the space between the decorative material 5 and the carrier 3 is filled with a foam layer 6.

10 [0018] The decorative material 5 has a pressing zone 7 which runs around the foam layer 6 over the entire circumference and in which the decorative material is adhesively bonded directly to the carrier 3 in a gas-tight manner. To make the adhesive bond, the use of separate adhesives is unnecessary, as a rule, since a film penetrating into the pressing zone and consisting of the
15 not yet fully reacted material of the foam layer 6 brings about the necessary material connection.

[0019] In the production of the trim article 1, as illustrated in fig. 3, first, a panel-shaped, gas-permeable and, if appropriate, also foam-permeable
20 semifinished product 8 consisting of resin-bound flax fibers and sisal fibers is pressed into a carrier 3 which may have a relatively simple three-dimensional configuration. During the pressing of the semifinished product 8, zones 9 (small wall thickness) are highly compressed by the contour of the press die in the carrier 3 and zones 10 compressed to a lesser extent are formed. The
25 material of the semifinished product is compressed into the highly compressed zones 9 in such a way that the carrier is both foam-tight and essentially gas-tight in these regions. There continues to be air-permeability in the zones 10 compressed to a lesser extent. However, the material is compressed there to such an extent that a throughflow of foam in this region
30 is ruled out during the subsequent foaming process.

[0020] Subsequently, a gas-tight polyurethane spray-on skin 13, from which the decorative material 5 is later formed, is introduced into the cavity of a mold half, indicated by the reference symbol 11, of a two-part foaming die 12. That region of the mold half which is covered by the spray-on skin 13 is somewhat larger than the area of the later decorative material 5, but
5 markedly smaller than the carrier 3. Subsequently, the foam material is introduced into the cavity and the previously formed carrier 3 is laid onto the not yet fully reacted spray-on skin 13 and is pressed onto the spray-on skin 13 by means of a further, complementary mold half (not illustrated). In this
10 case, the pressing zone 7 running around the foam layer 6 is formed and closes off the region between the carrier 3 and the decorative material 5 outwardly in a gas-tight manner. The air displaced out of the interspace between the carrier 3 and decorative material 5 under the action of the expanding foam can escape via the zones 10 compressed to a lesser extent.
15 By means of a controlled arrangement of the zones 10 compressed to a lesser extent, therefore, the propagation of the foam can be influenced.

[0021] For the tie-up to the metal structure of the body, the trim article 1 may have, furthermore, what may be referred to as a touch-up position 16, in
20 which the decorative material is locally pressed directly onto the surface of the carrier in the region of the foam layer 6, in order, for example, to form a bearing surface for a screw connection. For this purpose, the mold half 11 is provided with a corresponding projection 17.

[0022] Finally, the trim article 1 can be removed from the foaming die 12
25 after the opening of the mold halves. The slight excess 14 of decorative material can be removed in a simple way without a tool, since a peripheral knife edge 15 incorporated into the mold half 11 forms in the decorative material 5 a predetermined breaking point surrounding the pressing zone 7.

Reference symbols

| | | |
|----|----|------------------------------------|
| | 1 | Trim article |
| | 2 | Metal structure |
| 5 | 3 | Carrier |
| | 4 | Vehicle interior |
| | 5 | Decorative material |
| | 6 | Foam layer |
| | 7 | Pressing zone |
| 10 | 8 | Semifinished product |
| | 9 | Highly compressed zone |
| | 10 | Zone compressed to a lesser extent |
| | 11 | Mold half |
| | 12 | Foaming die |
| 15 | 13 | Spray-on skin |
| | 14 | Excess |
| | 15 | Knife edge |
| | 16 | Touch-up position |
| | 17 | Projection |

Amendments to the Specification:

Please amend the specification as follows:

A substitute specification has been submitted pursuant to 35 C.F.R. § 1.125 and MPEP 608.1(q). Attached to this Preliminary Amendment is a clean copy and a marked up version of the revised specification.